Manitoba Research Council

MANITOBA RESEARCH COUNCIL ANNUAL REPORT 1987 - 1988

Note: This edition of the 1987/88 MRC Annual Report has been reproduced for the purposes of tabling in the Manitoba Legislative Assembly to meet the requirements of Section 13 of the Research Council Act.

A printed edition, using identical text, is currently being prepared for public information and promotional distribution.

The Manitoba Research Council

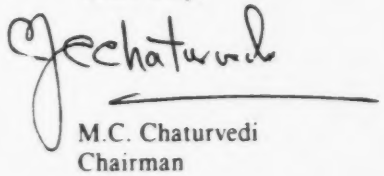
June 30, 1988

Honourable J.A. Ernst
Minister
Industry, Trade and Tourism
Room 358, Legislative Building
Winnipeg, Manitoba
R3C 0V8

Dear Mr. Ernst:

I am pleased to submit, for your consideration, the Annual Report of the Manitoba Research Council for the fiscal year ended March 31, 1988.

Yours truly,



M.C. Chaturvedi
Chairman

MANITOBA RESEARCH COUNCIL ANNUAL REPORT 1987 - 1988

THE MANITOBA RESEARCH COUNCIL

Working closely with industry, government and universities, the Manitoba Research Council (MRC) plays a lead role in encouraging and facilitating scientific research and technological development.

The MRC, an agency of the Province of Manitoba, also advises the government on developments in new technologies as they relate to the social and economic prospects of the province

The MRC has three divisions: the Administration Division located in downtown Winnipeg, the Canadian Food Products Development Centre (CFPDC) in Portage la Prairie, and the Industrial Technology Centre (ITC) in St. Boniface.

Through its two operating divisions, the MRC assists industry in the development and implementation of technology. CFPDC specializes in the development and testing of food, feed and beverage products, while ITC provides all other product development and testing services to industry.

MRC's administration division provides support services to the two operating divisions and to the Board of Directors.

THE CHAIRMAN'S REPORT

During the year the Manitoba Research Council made significant strides in three areas; strategic planning, networking and service rationalization. These were with the goal of providing more relevant and cost effective services to Manitoba industry and especially to Manitoba's many small and medium sized companies.

Completion of the strategic planning cycle saw the development of a long term, ten-year, strategic plan and a medium term, three-to-five year plan. In-depth examination of current position and future needs, by both staff and the Board resulted in the development of a revised mission statement and new charter of objectives. The new mission, which is as follows, is intended to lead MRC into the next decade:

"The Manitoba Research Council is an industrial research and development organization established by the Province to strengthen the use of appropriate science and technology for the economic and social development of Manitoba, through the provision of contract technology transfer, testing, product development, and other services for local, national and international private and public sector clients; both independently and through strategic alliances. MRC manages its resources prudently, acting as a responsible corporate citizen, dedicated to profitability, growth, the advancement of its employees, and the success of its clients."

Strategic networking and the formation of strategic alliances continued during the year. Three specific initiatives were developed under the MRC/University of Manitoba memorandum. Agreements were signed with both Red River Community College and the Churchill Northern Studies Centre and enhanced networking continued with the other western provincial research organizations. All of these permit MRC to provide more comprehensive and cost effective services to local industry.

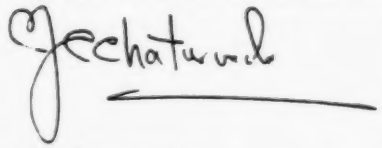
Finally, as part of the planning process, service rationalization, targetted marketing and strategic service development have been instituted to significantly enhance self sufficiency over the next five years.

Several Board membership changes occurred during the year, with the continuation of the procedure to replace one third of the Board annually. The following Board members retired during the year: Prof. M. Vaisey-Genser, Dr. C. Belke, Ms. Devinder Bhuller, Mr. G. Rajotte and Dr. A. Wexler.

On behalf of the Board, I wish to thank these members for their invaluable contribution. Special thanks are due to Prof. Vaisey-Genser for her tireless dedication to the Council and its staff in her position as Chair during the past five years.

I am pleased to welcome the following new Board members: Mr. H. Chippendale, Mr. D. Johannson, Mr. G. Russel and Mr. A. Thibeault.

I wish to acknowledge the continued support from the government of Manitoba and from the Honourable J.A. Ernst, Minister Industry, Trade and Tourism. As well, I wish to acknowledge the dedication of our Board members and the commitment and achievements of our staff.

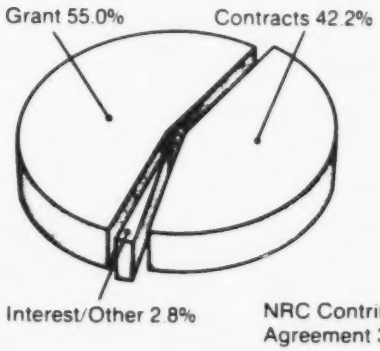


M.C. Chaturvedi,
Chairman of the Board

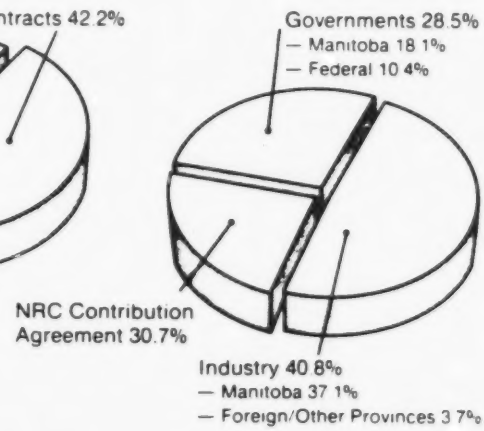
FINANCIAL SUMMARY

Income	1987/88	1986/87
Contracts	$2,240,073	$2,330,778
Grant from Province of Manitoba	2,917,900	2,957,000
Interest/Other	150,099	77,033
Expenses		
Operating	4,967,723	4,679,098
Capital	508,933	541,520
Net Income	($ 168,584)	$ 144,193

SOURCES OF REVENUE 1987/88

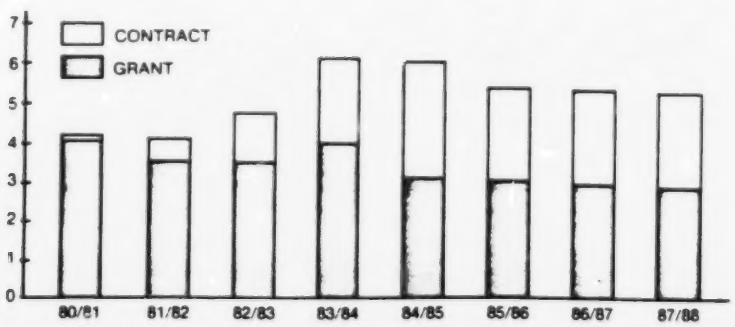


SOURCES OF CONTRACTS 1987/88



EIGHT YEAR SUMMARY

millions of dollars



THE PRESIDENT'S REPORT

As part of the Manitoba Research Council's long term strategic plan, which was developed during the year, MRC has targetted to increase its self sufficiency level to 60% over the next three years, with higher self sufficiency levels planned in subsequent years. To meet these goals, a number of strategic options have been developed. These include strategic alliances with other organizations, service rationalization, efficiency enhancements and directed initiatives. The long term goal is the delivery of enhanced services to local industry with reduced cost to the Province, while satisfying MRC's economic development mandate.

During the year, several steps were taken to initiate these goals. Both operating divisions implemented a number of actions to provide a greater presence in existing and new markets. Detailed marketing plans were developed, including general awareness campaigns, targetted personal selling and detailed follow-up with former clients.

In addition several new areas of local industry needs have been identified as potential future service offerings. These include areas such as food packaging services and specialized testing services for the local furniture industry.

MRC continues to recognize the importance of Manitoba's many small and medium sized enterprises (SME's) to the provincial economy. MRC's long term plans centre around the unique needs that SME's have for technical information, specialized technical services and appropriate technology.

MRC's total revenue for 1987/88 was $5.308 million as compared to $5.365 million for 1986/87. Contract revenue was $2.240 million in 1987/88 as compared to $2.331 million in 1986/87. Overall self sufficiency remained at 45%, as in the previous year. During 1987/88, 40.8% of contract revenue was from contracts with industry, while 28.5% was from contracts with federal or provincial government departments. Five hundred and sixty contracts were completed during the year, resulting in an average contract value of $4000., once again illustrating the large proportion of small contracts conducted for Manitoba SME's.

During the year, expenses exceeded revenues by $168.6 thousand. As is shown in the financial statements, this represents planned utilization of unexpended funds for the purchase of specific testing equipment.

Total contract revenue for the Canadian Food Products Development Centre increased by 7% from $877 thousand in 1986/87 to $938 thousand in 1987/88. Of this year's contract revenue, 40.7% was from industrial sources. CFPDC completed 160 contracts during the year.

Total contract revenue for the Industrial Technology Centre was down 10%, from a level of $1.453 million in 1986/87 to $1.302 million in 1987/88. Of this year's contract revenue, 41% was from industrial clients. ITC completed 400 contracts during the year, with 330 of these for Manitoba industry.

Under MRC's industrial advisory programs, which are supported both by the grant from the Province of Manitoba and by the National Research Council IRAP contribution agreement, the total number of client contacts was 7656, which was a 16% increase over the previous year's level. Sixty-nine per cent of our clients were in Winnipeg, while 30% were in rural Manitoba and 1% were out of province.

During the year MRC continued to benefit from its strategic alliances with other Provincial research organizations, the National Research Council of Canada, and local educational institutions. The specific initiatives underway with the University of Manitoba in agri-food biotechnology and advanced industrial materials illustrate the positive benefits that can be achieved with appropriate networking.

I wish to acknowledge the continued grant support from the province and the continued support from the National Research Council, both of which provide for MRC's comprehensive local technology transfer infrastructure.

I wish to thank the Board of Directors for their continued, valued advice and guidance and especially the members of the executive committee, Mahesh Chaturvedi, John Ingraham and Derek Johannson for their support and hard work.

Finally I wish to thank all our staff for their dedication to the continued growth of MRC and their vision of making MRC more effectively serve the needs of Manitoba industry.

Erling Nyborg
President

THE CANADIAN FOOD PRODUCTS DEVELOPMENT CENTRE

The Canadian Food Products Development Centre (CFPDC) was established jointly in 1978 by the Province of Manitoba and the Federal Government of Canada in response to the need for a facility providing product research, development and testing services to the national food, feed and beverage industries.

CFPDC provides centralized access, on a contractual and confidential basis, to product testing, development, research and pilot-scale production facilities. It offers clients the expertise and experience of a dedicated team of food technologists, engineers, technicians and consultants: the resources clients need to develop new and better products and more cost-effective production techniques.

CFPDC PROGRAMS

Technical Advisory Services — Technical information services provide industrial clients with access to extensive holdings of books, journals, catalogues, standards and regulations relating to the food industry. In addition, world-wide food information is available through computer access to more than 200 technical databases. About 3000 on-site records can be accessed by computer. Industrial field advisory services and access to financial assistance programs are available to industry through funding from the grant from the province of Manitoba and the National Research Council Industrial Research Assistance Program.

Product Development Services — Product development activities range from turning an idea into a new food product to finding uses for by-products. Expertise and equipment are available to conduct flavour, colour and texture analyses, as well as sensory evaluation to suit home, restaurant and institutional food requirements.

Microbiological Services — Microbiological laboratories are equipped to evaluate foods for spoilage and pathogenic organisms. Facilities for both enumeration and identification are available on site, including consulting assistance in food plant sanitation and microbiological procedures.

Chemical Analysis Services — Chemical analysis services range from routine protein, fat and moisture determinations to sophisticated tests for trace constituents and contaminants, such as vitamins and pesticides. In addition to a well-equipped wet chemistry facility, instrumental capabilities include gas chromatography with flame ionization, nitrogen-phosphorous, and electronic capture detectors. HPLC capability includes gradients, computer workstation and refractive index, variable wavelength UV, and spectrofluorescence detectors.

Food Engineering Services — Food engineering services include consulting assistance in process development and optimization, equipment specification and selection, plant layout and design and energy conservation.

Pilot Plant — The pilot plant is equipped and serviced for production of new food products on a trial basis. Technical skills and equipment are available to assist with process development in the areas of dairy, meat products, fruit and vegetables, and cereal technology (including baking). Processing capabilities include cooking, blanching, freezing, battering and breading, drying and membrane separation. The pilot plant is Meat Hygiene Directorate-inspected so test products containing meat can be distributed interprovincially and internationally.

1987/88 ACTIVITY HIGHLIGHTS

Contract Services: Contract revenue during the year was $938 thousand, representing an increase of 7% over the previous year. One hundred and sixty contracts were completed, representing an average contract value of $5864. Of total contract revenue 40.7% was from industry sources, 37.4% from federal and provincial contracts and 21.9% from the National Research Council IRAP contribution agreement.

Technical Advisory Services: Under the technical advisory services program, supported by the provincial grant and by the NRC IRAP contribution agreement, 2,177 client contacts were made during the year, representing an 11% increase over the previous year. Of the clients served, 65% were in Winnipeg, 32% in rural Manitoba and 3% out of province. CFPDC's reputation as a technical resource centre for the food industry is internationallly recognized. During the year inquiries and proposals for technology transfer arrangements were received from economic development bodies in four continents.

Project Highlights:

- The refrigerated shelf-life of further-processed turkey products was determined for a Winnipeg client which allowed the processor access to a larger market.
- The microbiological and organoleptic shelf life of fresh vacuum-packed pork loins was studied. If a rapid chill technique is used, a shelf life of at least 30 days may be achieved, making foreign markets attainable.
- Monitoring of dairy products for pathogenic bacteria continued

to ensure clients' product safety. *Listeria* and *Salmonella* remain the chief concerns microbiolically.

- Testing is continuing on products sold by the Manitoba Liquor Control Commission for contaminant and quality factors. New listings are tested before they are sold to stores, and customer complaint samples are also tested. Testing services are also provided to other provincial liquor boards.
- During the year capability was developed to test edible oils for trace amounts of nitrogen and sulphur.
- Testing for sulphathiazole residues continued for the honey industry. This testing is now accreditated by Agriculture Canada.
- Numerous nutritional and trace contaminant tests were conducted on meat, dairy and vegetable products.
- A study to determine the effect of cooking methods on nutrient composition of food was conducted.
- Formulations and preparation methods were developed for specialty bakery products that will be featured in a Winnipeg restaurant.
- A cocktail mix was formulated and the pilot plant was used to produce test market quantities. The client is now marketing the product in the hotel and restaurant industries.
- Product development work was conducted on a line of honey-based spreads for a rural Manitoba company. The client plans to launch the product by the end of 1988.
- A one-day workshop on sensory evaluation was presented to staff of a large Manitoba processor.
- A formulation was developed for a pizza sauce to be used by a new rural restaurant.
- Several product development projects were undertaken on pickles, a line of chilled desserts as well as novelty desserts, and a wild rice-based snack food.
- CFPDC in conjunction with the University of Manitoba has completed a three-year program to assess the potential for a frozen, sweet corn industry in Manitoba. A cultivar was identified which, when processed and frozen as kernels, was judged by customer panels to be better than commercially available corn.
- Assistance was provided to a Winnipeg company in the preparation of ingredients for ethnic food products. The client is now producing the products for sale in Manitoba and Alberta.
- Frozen, pre-browned poultry products are being produced for test market purposes in the pilot plant for a large Manitoba company.
- Following development and test market pilot plant production, a Winnipeg client is successfully selling a gourmet barbecue sauce to the retail trade in Manitoba and Ontario.
- A federal contract was initiated on the testing of membrane technologies for concentration of low sugar substrates for ethanol production. The project is scheduled to be completed in 1989.
- A project evaluating commercial applications of separation techniques for the food and biotechnology industries has been completed, identifying three successful applications. The first was the recovery of potato blanch and cutting waste water for recycle in the vegetable industry. The other two were in the meat industry — concentration of bovine plasma and concentration of procine blood.

Success Stories:

- J.C. Foods, a Winnipeg based processor of chicken products has seen continual growth and prosperity in its five years of operations. Sales are national in scope and are made to retail and institutional markets. J.C. Foods now employs over 40 personnel. CFPDC originally assisted in product development, testing and process scale-up operations.
- CFPDC developed a line of bake mixes for Mug'n'Muffin in Brandon. Training for company workers was also provided. In the last three years, sales have increased continually, allowing the creation of three new jobs.
- In the two years since CFPDC helped Sunco Foods of Winnipeg develop their Chinese fried noodles, sales have grown for this Winnipeg company. By having a more extended product line, sales in other products were also stimulated creating jobs for two new employees.

Staff Highlights:

CFPDC personnel worked closely with technical and regulatory bodies during the year. A number of noteworthy events are as follows:

- T.J. McEwen, Vice-President Food Product Development, served as national president of the Canadian Institute of Food Science and Technology during the year. The Institute is national in scope, with members in academics, industry and government and is dedicated to the advancement of food technology. Several other staff members also are very active in the Institute's local chapter.
- J. Hilliard, Chemistry Department Manager, has been an active member of the Association of Official Analytical Chemists for many years. During the year, a major accomplishment was achieved when Dr. Hilliard established the Prairie Section of this organization.
- Several keynote presentations were made by staff including two in Toronto and two in Winnipeg. These included lectures on microorganisms and microwave cooking to the Canadian Frozen Foods Association, general microbiology to a processed meat seminar sponsored by a large spice supplier, emerging and newly identified disease agents to public health inspectors and the safety of meat and fish at the University of Manitoba's Food Science seminar series.

FOOD PRODUCTS ADVISORY COMMITTEE

The Canadian Food Products Development Centre uses an industry-based advisory committee to aid in the formulation of programs and the definition of new initiatives which meet the needs of Manitoba industry. 1987/88 committee members were:

Mr. H.D. McRorie (Chairman) — Royal Bank
Dr. W. Bushuk — University of Manitoba
Dr. E.A. Earl — Canola Council of Canada
Mr. D. Jones — Campbell Soup Co. Ltd.
Mr. D. Lewis — Canada Dept. of Regional Industrial Expansion
Dr. D. Murray — University of Manitoba
Mr. J. Portree — Manitoba Department of Agriculture
Mr. A.R. Tweed — Woodstone Foods Ltd.
Mr. M.F. Wallace — Manitoba Dept. of Industry, Trade & Tourism

MRC acknowledges the valuable contribution, guidance and advice received from this committee and also wishes to thank Mr. S. Ridgeway, Mr. B. Sandercock and Mr. T. Van Rosmalen who retired from the committee during the year.

THE INDUSTRIAL TECHNOLOGY CENTRE

The Industrial Technology Centre (ITC) was established jointly in 1978 by the Province of Manitoba and the Federal Government of Canada to help Manitoba industries to capitalize on the increased efficiency and productivity possible through the use of applied technology.

ITC is a unique, full-service, product design, development and testing facility, offering specialized, integrated services addressing the entire product development cycle, from concept to completion. By delivering high quality, specialized, integrated services in mechanical engineering, electronics, environmental and analytical chemistry, materials science and computer aided engineering, ITC provides essential services to Manitoba industry in the development and manufacture of industrial and consumer products.

ITC assists many firms and industries in bridging technological gaps, finding new products and methods, bringing products to market, providing essential environmental and analytical chemistry services, and in becoming more competitive regionally, nationally, and internationally.

ITC PROGRAMS

Technology Advisory Services — ITC offers a variety of no-charge advisory and information services to Manitoba industry, supported both by the provincial grant and by a contribution agreement from the National Research Council of Canada Industrial Research Assistance Program. These services include information and technical library access such as technical literature, data base sourcing and international patent information; consulting assistance addressing product development problems; information on government assistance programs and demonstrations of VAX and PC-based CAD/CAM systems. Although available to all, these services are of particular importance to Manitoba's small and medium sized manufacturers.

Electronics Engineering Services — Electrical and electronics engineering staff and equipment are available to perform design, product development assistance and general consulting services. Design services include electronic circuit design, printed circuit board design, communications systems design and industrial applications. Product development services include product selection assistance, product testing, evaluation and electronic retrofitting of manufacturing equipment.

Mechanical Design and Analysis Services — Mechanical engineering staff provide product design and analysis assistance to industrial and government clients. Technical problems solved include product design, function, structural integrity, system dynamics, safety and cost effectiveness. Specialized services are available in areas of vibration, noise control, finite element analysis, solids modelling and computer aided engineering.

Prototype/Product Fabrication Services — ITC offers custom machining and fabrication services to produce and test prototypes to customer specifications.

Product Testing Services — Client testing services enable products to be tested to many national standards and regulations. ITC is accredited by the Standards Council of Canada for a large range of mechanical, physical and chemical tests. Specific metallurgical testing services are also available.

Environmental and Analytical Chemical Services — A wide range of chemical and environmental services are provided to industry including analysis, testing, and product development. Capabilities in the area of chemical analysis include industrial and hazardous waste analysis, workplace air quality monitoring, fuels and lubricants testing, transformer gas analysis, contaminant identification and specification verification. Product development capabilities include material evaluation and sourcing, microorganism identification, formula review, quality control testing and process evaluation.

1987/88 ACTIVITY HIGHLIGHTS

Networking and Strategic Alliances: A number of initiatives were undertaken during the year to more effectively link and network ITC services with other organizations, as follows:

- ITC agreed to provide Manitoba's Regional Development Corporations with evaluations of the technical components of economic development proposals under consideration.
- The Association of Consulting Engineers of Manitoba, the Manitoba Branch of the American Industrial Hygience Association and ITC are working together to provide Manitoba industry with a comprehensive workplace air quality service.
- Under the MRC/University of Manitoba Memorandum of Understanding cooperative programs were initiated during the year in agri-food biotechnology and in advanced industrial materials. These provide unique, specialized local services by joining the strengths of both organizations.
- ITC and the Faculty of Engineering, University of Manitoba are cooperating in offering technical services to industry in

specialized areas such as finite element analysis, vibration analysis and noise monitoring.

• To ensure that Manitoba has a viable engine test facility, the ITC engine test equipment has been transferred to the Mechanical Engineering Department, University of Manitoba. This consolidation of ITC and U of M engine test equipment will not only place the Faculty of Engineering in a better position to undertake research and development and educate students, but also ensures that MRC has access to a well maintained and staffed engine test laboratory.

Information/Promotion: During the year, a number of promotional initiatives were completed to inform industry of the services offered. These included:

• A joint open house with the University of Manitoba for Manitoba manufacturers.

• Participation in the American Industrial Hygience Symposium and Trade Show.

• Participation in the Pembina Valley Business Show in Winkler.

• Organization of a seminar on production technology which was attended by 100 Manitoba business leaders.

• Participation and technical presentations by ITC staff at Miconex 87.

• Participation in biotechnology seminars to University of Manitoba business and administration students.

• Four open houses were held for rural Manitoba industry, and members of the Manitoba Fashion Institute, Manitoba Trucker's Association and the Association of Consulting Engineers of Manitoba.

In addition to these initiatives, ITC staff also met with member firms of Furniture West and the Manitoba Fashion Institute to gain a better understanding of these industries and their technology requirements. These initiatives were implemented with the support of the ITC Advisory Committee.

Technical Advisory Services: Under the technical advisory services program, supported both by the provincial grant and the NRC-IRAP contribution agreement, 5479 client contacts were made during the year. Of the clients served, 71% were in Winnipeg and 29% in rural Manitoba. The ITC library continued to be of notable benefit to industry clients. Of special use were the VSMF microfilm component catalogue and industry standards service, as well as the patent information service.

Contract Services: Contract revenue during the year was $1.302 million, as compared to $1.453 million in 1986/87. Average contract value was $3050. Of the total contract revenue 41% was from industry sources, 22% from federal and provincial contracts and 37% from the National Research Council IRAP contribution agreement. Of the 400 contracts completed for industrial and government clients, 330 were for Manitoba industry clients.

Project Highlights:

• The design of an Application Specific Integrated Circuit (ASIC) was undertaken for a Manitoba client. This technology is revolutionizing the electronics industry and is being applied by out-of-province electronics manufacturers. ITC is now in a position to assist Manitoba-based companies in applying ASIC's to their products.

• Several specialized finite element analysis projects on transmission components were completed for a U.S. based company.

• Several air quality monitoring projects were completed as part of ITC's industrial hygiene service.

• The retrofit of production equipment for an apparel industry client was initiated. This project demonstrates the cost effectiveness of equipment retrofitting to the apparel industry, and has led to further interest in this ITC service from other apparel manufacturers.

• A project for the follow-up monitoring of small scale energy projects was completed for the Manitoba Department of Energy and Mines.

• Hazardous wastes were identified for a number of companies to assist them in complying with regulatory requirements.

• A prototype on-board vehicle computer system, for operational data logging was completed for a local entrepreneur. This product will soon be marketed internationally and has attracted interest from several large potential customers.

• Several production dies were manufactured for clients using our electro-discharge machining service.

• A study of the suitability of a calibration system for a chemical sensor was carried out for a local manufacturer.

• A prototype electronics-based device for use in racquet sports was developed for a local company. This product is unique in the industry and will help differentiate the company's business from would-be competitors.

• Vibrations transmitted through the floor from a printing press in a Winnipeg company were measured and analyzed.

• Problems concerned with fuel contamination and product quality were resolved for a number of clients.

• A microprocessor-based device for use in the music industry was developed for a Manitoba company. This product has been recognized by world class musical instrument manufacturers as unique in the field and will soon be marketed internationally.

• Several automotive ball joints were dynamically tested to industry standards to determine their endurance.

• The first phase of a project to demonstrate the potential for wide spread application of groundwater heat pump technology in Manitoba was completed.

• Several drier balancing projects were completed for pulp and paper companies.

• Vibrations generated by hydroelectric turbines, under transient operating conditions were analyzed for Manitoba Hydro.

- The testing of driver protective shields for Winnipeg taxicabs was completed for the Manitoba Department of Highways and Transportation.
- Many small physical and materials testing projects were completed for a number of Manitoba companies.
- Work was conducted under the Methanol in Large Engine (MILE) program and included the verification of an aldehyde emission field monitoring procedure, a study of fuel additives for luminosity and lubricity, and ongoing crankcase oil and fuel analysis.
- A finite element analysis project was undertaken on a bus hoist saddle for a local company.
- The first phase of the development and prototype manufacture of a dobby mechanism used in the weaving of design fabrics has been completed for the Pakistan Council of Scientific and Industrial Research. This project is being funded by the International Development Research Centre, Ottawa.

Staff Highlights:

A number of ITC staff attended specialized training courses or were involved with specific association activities during the year, as follows:

- K. Takatch completed a course in gas vapor and particulate sampling at the National Institute of Occupational Safety and Health.
- M. Velpel and G. Lypka completed a course in quality assurance for chemistry laboratories with the Association of Official Analytical Chemists.
- G. Ruttig completed a course in basic finite element analysis at the Structural Dynamics Research Corporation.
- J. Begin completed a course in noise control for buildings, manufacturing plants, equipment and products with Bolt Beranek and Newman, Inc.
- D. Paradis and T. Braun completed a course in the design of application specific integrated circuits with LSI Logic.
- D. Zvanovec completed a course in the machinability of metals sponsored by the Society of Manufacturing Engineers.
- G. Barber, J. Nowoselski, E. Rieger and B. McNeill completed a course in Wps Plus with Digital Equipment Corporation.
- T. Cornell accompanied a Furniture West mission to England, Germany and Italy as a technical advisor on production techniques. This mission was sponsored by External Affairs, Canada.
- G. Lypka completed an industrial hygiene review course at the Midwest Center for Occupational Health and Safety.
- W. Rempel completed courses in ultrasonic assembly process for thermoplastic parts, introduction to plastic materials and plastic part design with the Society of Plastics Engineers.
- K. Thacher was elected to the board of directors of the Electronics Industry Association of Manitoba.
- Y. Muzyka completed courses in introduction to plastic part design and a designers guide to part design for economic injection molding with the Society of Plastics Engineers.

TECHNOLOGY ADVISORY COMMITTEE

ITC uses an industry based technology advisory committee to provide advice on the types of services and capabilities needed by local industry. The committee has representation from 12 industrial, business and academic associations. During the year, membership was increased by the addition of a representative from the Manitoba Chamber of Commerce. 1987 88 advisory committee members were:

Mr. E. Crowder, Winnipeg (Chairman)
Mr. M. Babulic, Inco Limited (Manitoba Economic Development Network)
Mr. J. Chesterfield, Northern Telecom (Electronics Industry Association of Manitoba)
Mr. A. Harris, (Manitoba Trucking Association)
Mr. A. Hayden, (Canadian Manufacturers Association)
Mr. G. Hermanson, (Red River Community College)
Dr. T.R. Hsu, (University of Manitoba)
Mr. H. Mardon, Investors Group (Manitoba Chamber of Commerce)
Mr. W.K. Newman, (The Mining Association of Manitoba Inc.)
Mr. G. Ranson, Inventronics Ltd. (Brandon Economic Development Board)
Mr. W.A. Reid, Canadian Bronze Company Limited (Winnipeg Business Development Corporation)
Mr. J. Sammons, Fournier Stands Mfg. of Canada Ltd. (Furniture West)
Mr. M. Silver, Western Glove Works Limited (Manitoba Fashion Institute Inc.)

MRC acknowledges the essential and valued contribution, guidance and advice of this committee.

TECHNOLOGY ADVISORY SERVICES

The Manitoba Research Council offers essential information and technology advisory services to Manitoba industry. This program which is funded both by the Provincial grant and by a contribution agreement from the National Research Council Industrial Research Assistance Program, helps industry solve technical programs, improve productivity, and introduce new materials, equipment and technology. There is no charge to industrial clients for services under this program, which may include library services, literature and database sourcing; provision of consultants to assist in addressing product development problems; information on the availability of government assistance programs; demonstrations of VAX and PC-based CAD/CAM systems; and technical advice to Regional Development Corporations and government departments.

During the year advisory services staff answered 7656 requests for service, which was 16% above the previous year's level. The distribution of clients was 69% in Winnipeg, 30% in rural Manitoba and 1% outside Manitoba. Services were also broadened during the year by recruitment of an industrial technology advisor to serve the local construction industry.

During the year staff also helped local industry obtain funding for 256 projects under the National Research Council's IRAP-H, IRAP-L and IRAP-M contribution programs.

The assistance and cooperation of Mr. Roger Clarke the National Research Council's provincial coordinator for IRAP field services, is acknowledged in maintaining close effective working relationships between MRC staff and the NRC IRAP field network.

STRATEGIC ALLIANCES

During the year, the cooperative agreement between MRC and the University of Manitoba was effectively utilized to establish three initiatives as follows:

- Dr. M. Dawood, together with MRC's hybridoma laboratory, was relocated to the Department of Food Science at the University of Manitoba to establish a joint agri-food biotechnology laboratory utilizing the strengths and capabilities of both groups. By year end several significant research contracts were in progress for local industry.
- Dr. K. Tandon was relocated to the Department of Mechanical Engineering at the University of Manitoba to establish a cooperative initiative in advanced industrial materials, utilizing the capabilities of both groups. By year end several significant projects were underway for local industry.
- An agreement was concluded with the University for cooperative support from MRC, the University and the National Research Council for maintaining the University's Institute for Technological Development (ITD). ITD provides a liaison with the University and local industry and maintains a coordinating link with client services provided by MRC and the NRC IRAP program. MRC's contribution is the provision of Mr. R. Hoemsen, who has been seconded from MRC to manage ITD.

As a result of the cooperative agreement between MRC and the Saskatchewan Research Council, significant progress was made during the year in the sharing and utilization of unique client capabilities. At year end negotiations were in progress with the Alberta Research Council for development of a similar cooperative agreement.

As well, during the year, cooperative agreements were developed with the Red River Community College and with the Churchill Northern Studies Centre to initiate cooperation in areas of mutual interest.

MRC continued to profit from its membership in the Association of Provincial Research Organizations. This strategic alliance effectively links the eight Canadian Provincial Research Organizations, in areas of common interest such as the development of programs to service small and medium sized businesses.

REPORT OF THE PROVINCIAL AUDITOR'S OFFICE

We have examined the financial statements, being Exhibits A and B and Schedule 1, of The Manitoba Research Council for the fiscal year ended March 31, 1988. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of The Manitoba Research Council as at March 31, 1988 and the results of its operations for the year then ended in accordance with the accounting policies stated in note 2 to the financial statements applied on a basis consistent with that of the preceding year.

June 22, 1988
Winnipeg, Manitoba

F.H. Jackson, C.A.,
Provincial Auditor.

MANITOBA RESEARCH COUNCIL

EXHIBIT A

BALANCE SHEET
as at March 31, 1988
(with 1987 figures for comparison)

	1988	1987
ASSETS		
Current:		
Cash	$ 5,500	$ 5,500
Funds on deposit with the Minister of Finance:		
Trust accounts	396,674	331,821
Term deposits	1,348,892	1,416,628
	1,745,566	1,748,449
Accounts receivable and prepaid expenses:		
Government of the Province of Manitoba	20,549	250,019
Government of Canada	61,917	85,842
Other	296,767	403,212
	379,233	739,073
Less: Allowance for doubtful accounts	33,394	13,437
	345,839	725,636
	2,096,905	2,479,585
Fixed: at cost (Notes 2 and 3)	7,779,579	7,456,631
	$9,876,484	$9,936,216
LIABILITIES AND FUND BALANCES		
Current:		
Accounts payable	$ 384,467	$ 509,032
Advances on contracts	1,410	81,181
	385,877	590,213
Loan payable (Note 5)	80,546	90,306
	466,423	680,519
Unexpended funds, Exhibit B	1,630,482	1,799,066
Investment in fixed assets (Note 2)	7,779,579	7,456,631
	$9,876,484	$9,936,216

EXHIBIT B

STATEMENT OF REVENUE AND EXPENDITURE AND UNEXPENDED FUNDS
for the year ended March 31, 1988
(with 1987 figures for comparison)

	1988	1987
Revenue:		
Grants from the Government of the Province of Manitoba	$2,917,900	$2,957,000
Contracts	2,240,073	2,330,778
Interest	115,582	77,033
Sundry revenue	34,517	—
Total revenue	5,308,072	5,364,811
Expenditure, Schedule 1:		
Operating	4,967,723	4,679,098
Capital	508,933	541,520
Total expenditure	5,476,656	5,220,618
Excess (deficiency) of revenue over expenditure	(168,584)	144,193
Balance of unexpended funds at beginning of year:		
As previously reported	1,841,209	1,670,872
Adjustment of prior period expenses (Note 6)	(42,143)	(15,999)
As restated	1,799,066	1,654,873
Unexpended funds at end of year	$1,630,482	$1,799,066

SCHEDULE 1

SCHEDULE OF EXPENDITURES

for the year ended March 31, 1988
(with 1987 figures for comparison)

	1988	1987
Expenditures:		
Operating: (Note 4)		
Advertising and promotion	$ 65,448	$ 11,935
Bad debts	14,498	14,386
Building maintenance and repair	62,070	63,298
Computer related expenses	113,593	123,673
Equipment-rentals, maintenance and repair	97,529	38,475
Fees-memberships, seminars, customs and audit	109,126	110,815
Heating, utilities and taxes	153,386	154,043
Interest on loan	12,507	13,821
Laboratory supplies	249,686	233,833
Library — consultants and publications	72,136	75,736
Miscellaneous	1,642	182
Postage and telephone	101,027	110,637
Printing and stationery supplies	75,944	83,864
Purchased testing services	147,059	125,571
Real estate rental	213,778	156,660
Salaries and employee benefits	3,313,577	3,202,463
Staff transfer and relocation costs	15,467	7,067
Travel and transportation	149,250	152,639
	4,967,723	4,679,098
Capital:		
Equipment and furnishings	508,933	541,520
Total expenditures, Exhibit B	$5,476,656	$5,220,618

NOTES TO FINANCIAL STATEMENTS

for the year ended March 31, 1988

1. Nature of Operations

The Manitoba Research Council was established in 1963 with the following objectives:

a) to promote and carry on research and scientific enquiries respecting agriculture, natural resources, industry or other segments of the economy of the Province; and

b) to secure for Manitoba the benefits of research and scientific enquiries carried on elsewhere.

The Manitoba Research Council operates two laboratory facilities, the Canadian Food Products Development Centre in Portage la Prairie and the Industrial Technology Centre in Winnipeg.

2. Significant Accounting Policies

These statements are prepared on an accrual basis of accounting except:

a) Contract revenue is recognized when billed. Billings are made as work is completed during the project.

b) Fixed assets are charged to operating expenditures in the year of acquisition. The balance sheet reflects fixed assets at cost with a corresponding credit to "Investment in fixed assets." The Council's policy is to remove the cost of all physical assets from the accounts which have:
- become obsolete during the year,
- been sold or otherwise disposed of during the year, or
- in the case of leasehold improvements, a full write-off will be recorded at the termination of the lease period.

c) Certain general and administrative services are provided by the Province of Manitoba at no cost to the Council (Note 4).

3. Fixed Assets

	Balance March 31, 1987	Acquisitions	Deletions	Balance March 31, 1988
Automobiles	$ 30,000	$ —	$ —	$ 30,000
Building	80,000	—	—	80,000
Equipment	6,585,067	505,915	185,985	6,904,997
Furniture and Fixtures	369,599	3,018	—	372,617
Leasehold Improvements	391,965	—	—	391,965
	$7,456,631	$508,933	$185,985	$7,779,579

During 1986, the building and associated land owned by The Manitoba Research Council for the Canadian Food Products Development Centre facility were transferred to Manitoba Properties Inc. The Council retains the use of these buildings and continues to pay the related operating costs exclusive of rent which is paid from an appropriation of the Government of the Province of Manitoba. This transfer was reflected by a reduction in fixed assets and investment in fixed assets of $1,202,321.

The building recorded in the amount of $80,000 is located on land leased from the City of Winnipeg. The lease expires December 31, 1988, with the building then reverting to the City of Winnipeg unless other action is taken by the Council prior to that date.

4. Administrative Expenditures

The Department of Industry, Trade and Technology incurs certain general and administrative expenses on behalf of the Council which are estimated to be $13,600 for 1988 (1987 — $37,500).

5. Loan Payable

During fiscal year 1983/84, certain improvements were made to the facilities of the Industrial Technology Centre at a cost of $117,000. The cost was financed by way of a loan repayable over ten years in equal monthly installments of $1,855.63 including principal and interest. As at March 31, 1988, the outstanding loan principle amount was $80,546.

6. Adjustment of Prior Years' Expenses

The Council has retroactively initiated additional accruals for costs in order to comply more fully with the recommendations of the Public Sector Accounting and Auditing Committee of the Canadian Institute of Chartered Accountants.

As a result, the balance of unexpended funds at April 1, 1987 has been adjusted by the cumulative amount of $42,143 by which these expenses as at that date have increased; $26,144 of the amount is applicable to the year ended March 31, 1987 and has been included in expenditures for that year. The remainder of $15,999 is applicable to years prior to April 1, 1986 and the balance of unexpended funds at that date has been adjusted accordingly.

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INSTITUTE FOR TECHNOLOGICAL DEVELOPMENT
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*Member of Executive Committee

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The Manitoba Research Council is a member of The Association of Provincial Research Organizations Inc.